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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/618,015 | 07/11/2003 | Chun-Yuan Li | 59553 (71987) | 4394 |
| 21874 | 7590 | 06/07/2004 | EXAMINER | |
| EDWARDS & ANGELL, LLP P.O. BOX 55874 BOSTON, MA 02205 | | | PAREKH, NITIN | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2811 | |

DATE MAILED: 06/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|--------------------------|------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 10/618,015 | LI ET AL. |
| | Examiner Nitin Parekh | Art Unit 2811 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 11 July 2003.
 2a) This action is FINAL. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-9 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) Claim(s) _____ is/are allowed.
 6) Claim(s) 1-9 is/are rejected.
 7) Claim(s) _____ is/are objected to.
 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on 11 July 2003 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1.) Certified copies of the priority documents have been received.
 2.) Certified copies of the priority documents have been received in Application No. _____.
 3.) Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>2</u> . | 6) <input type="checkbox"/> Other: _____. |

DETAILED ACTION***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over admitted prior art (APA: US Patents 6229200 and 6143981) in view of Nakayama et al. (US Pat. 6208023).

Regarding claims 1, 3, 5, 8 and 9, the APA discloses a leadframe based non-leaded package (LFP) and a method of fabricating the LFP comprising steps of:

- preparing a leadframe (210 in Fig. 2) having a centrally located paddle portion and a peripherally located lead portion surrounding the paddle portion (211 and 212 in Fig. 2)
- mounting a semiconductor chip (220 in Fig. 2) mounted on the paddle portion of the leadframe
- a set of bonding wires (230 in Fig. 2) for electrically coupling/wire bonding the semiconductor chip to the lead portion of the leadframe
- the bonding wires being made of gold (page 3, line 3), and

- forming an encapsulation body (240 in Fig. 2) for encapsulating the chip and the bonding wires while exposing a surface of the lead portion of the leadframe

(APA: Fig. 2, specification page 2, line 19- page 3, line 10).

The APA fails to teach the paddle being formed with a recessed portion to a predetermined depth in one surface.

Nakayama et al. teach a leadframe package (LFP- see Fig. 2b) having a die pad/paddle (12 in Fig. 2b) being formed with a recessed portion, the recess having a predetermined depth so that package strength, encapsulating process reliability and chip positioning can be improved for the LFP (Col. 13, line 25- Col. 14, line 36).

It would have been obvious to a person of ordinary skill in the art at the time invention was made to incorporate the paddle being formed with a recessed portion to a predetermined depth in one surface as taught by Nakayama et al. so that the package strength, encapsulant adhesion and reliability can be improved in the APA's LFP.

Regarding claim 2, forming the recessed portion in the paddle of the leadframe do not distinguish over the APA and Nakayama et al. because only the final product/structure is relevant, not the process of forming the recess such as "half-etching", "coining" or "laser-cutting" or "pressing". Note that a "product by process" claim is directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann,

180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and In re Marrosi et al., 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a “product by process” claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in “product by process” claims or not . Note that applicant has the burden of proof in such cases, as the above case law makes clear. See also MPEP 706.03(e).

Regarding claims 4 and 7, the APA and Nakayama et al. teach substantially the entire claimed structure and method as applied to claims 1 and 5 respectively above, wherein the APA teaches the leadframe being formed with stepped portions in the paddle portion and the lead portions (see Fig. 2; specification page 3).

Regarding claims 2 and 6, the APA and Nakayama et al. teach substantially the entire claimed structure and method as applied to claims 1 and 5 respectively above, wherein the APA (see Mclellan et al.- US Pat. 6229200) further teach forming recessed portions in die pad and lead portions of a leadframe using conventional half-etch process (see Fig. 5c, 5d, 6b, 6c, etc.; Col. 6, lines 42-44) to provide the desired improvement in encapsulation, leadframe strength and bonding wire protection (Col. 6, line 10- Col. 7, line 22).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nitin Parekh whose telephone number is 703-305-3410. The examiner can normally be reached on 09:00AM-05:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on 703-308-1690. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-3431.

Nitin Parekh

NP

NITIN PAREKH

05-27-04

PATENT EXAMINER

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